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The present paper provides an overview of research related to moderators of life stress. Special attention is given to studies of social support, perceived control, and stimulation seeking. Also considered are important areas for future investigation.

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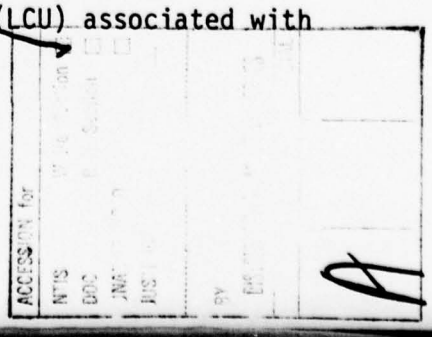
Life stress is a product of changes that occur in one's life which require adaptation, coping, and social readjustment. The changes include death or illness of family members, divorce, pregnancy, marriage, losing one's job, major financial readjustment, among others. As such changes are frequently encountered in the course of living they seem to represent ongoing sources of stress to which all individuals are exposed to a greater or lesser degree. While all persons experience life changes it is usually assumed that it is when high levels of change are experienced within a relatively short period of time that there are deleterious effects. Based on this assumption,numerous studies have been undertaken to determine the relationship between life stress and problems of health and adjustment. In this chapter we briefly consider methods of assessing life stress and literature bearing on relationships between life stress and other variables. The major focus of the chapter, however, is on variables which may mediate the impact of stressful life events and which may determine whether individuals are likely to be mildly or adversely affected by experiencing significant life changes.

Methods of Assessing Life Stress

Several approaches have been taken to the assessment of life changes. The oldest and most popular measure is the Schedule of Recent Experiences (SRE) developed by Holmes and Rahe (1967). The SRE consists of a list of 42 events to which subjects respond by indicating events experienced during the recent past and the number of times each event was experienced. A life stress score is derived by summing values termed "life change units" (LCU) associated with the events experienced.



To scale life change units, Holmes and Rahe had groups of subjects rate each of the events with regard to the amount of social readjustment living through the events would require. In making these ratings the item "marriage," assigned a value of 500, was used as a standard or anchor point. Subjects were asked to rate the other items by assigning values above or below 500 so as to reflect the degree to which each event required more or less readjustment than marriage. Life change units were derived by taking the mean adjustment rating for each event and dividing by the constant 10. These values were assumed to reflect the degree of stress resulting form experiencing the life changes.

The SRE was based on the assumption that change per se is stressful regardless of the desirability of the events. Consequently, it did not attempt to assess separately positive and negative life changes. Life stress scores derived from the SRE are, therefore, designed to represent the total amount of life change (positive and negative) experienced during the recent past.

Another approach to life stress has been taken in the development of the Life Experiences Survey (Sarason, Johnson & Siegel, 1978, reprinted in this volume; Johnson & Sarason, in press). Like the SRE, this measure requires respondents to indicate events experienced during the recent past. It differs, however, from the SRE in two important respects. In addition to reporting events experienced in the recent past, respondents must 1) categorize each event as having been desirable or undesirable, and 2) rate, on a seven point scale, the degree of impact that the event had on their lives. Summing the impact ratings of events designated as positive by the respondent provides a positive change score. A negative change score is derived by summing the impact ratings of those events

experienced as negative. Thus, the LES provides for individualized ratings of the impact of events and for the separate assessment of positive and negative life changes. Results of research with this measure have been reported by Sarason et al. (1978) and Johnson and Sarason (in press). While not presenting measures of life stress, several other investigators have also developed measures, for use in specific studies, that have allowed for the separate assessment of positive and negative change and the self rating of events (Mueller, Edwards & Yarvis, 1977; Vinokur & Selzer, 1975).

Studies assessing desirable and undesirable life changes separately have uniformly found negative but not positive change to be significantly related to stress-related dependent measures (Johnson & Sarason, in press; Mueller et al., 1977; Sarason et al., 1978; Vinokur & Selzer, 1975). Johnson and Sarason (in press) and Sarason et al. (1978) for example, have found variables such as anxiety, depression, neuroticism, and hypochondriasis, as well as others, to be significantly correlated with report of negative life changes. These variables were not found to be significantly associated with positive change. These results suggest that life stress may most meaningfully be conceptualized in terms of events that exert negative impacts. Findings such as these seem to support the usefulness of the LES over the SRE and indeed some data is available from comparative studies that suggests the LES is more predictive of relevant dependent variables than the SRE (Pancheri & De Martino, 1978; Sarason et al., 1978). In this regard Sarason et al. (1978) have examined the relationships between three life change scores (positive and negative life change scores, derived from the LES, and a total life change score derived by using life change units) and measures of social maladjustment, personal maladjustment, and depression. In each case, negative life change scores were found to be more highly correlated with dependent measures than were either positive change

scores or scores based on life change units. Pancheri and De Martino (1978) have obtained similar findings using indices of physical illness as dependent measures. This apparent superiority of the LES seems to be primarily due to the separate assessment of positive and negative life changes.

Correlates of Life Stress

Measured in various ways, life stress has been found to be related to a wide variety of variables that reflect health status, adjustment, and effectiveness of performance. Studies have found life stress to be significantly related to heart disease, pregnancy and birth complications, seriousness of illness, and the displaying of symptoms among persons with chronic illness (Bedell, Armour, Tavormina, & Boll, 1977; Edwards, 1971; Gorsuch & Key, 1974; Nuckolls, Cassell, & Kaplan, 1972; Rahe & Lind, 1971; Theorell & Rahe, 1971; Wyler, Masuda, & Holmes, 1971). Additionally, life stress has been shown to be related to tuberculosis, multiple sclerosis, and diabetes, as well as numerous other less serious physical conditions. These demonstrated relationships between life changes and a range of physical conditions suggest that life stress may increase one's general susceptibility to physical illness rather than being related to specific disorders.

In addition to correlations with physical illness, life stress has been found to correlate with psychiatric symptomatology (Dekker & Webb, 1974; Paykel, 1974), anxiety, depression, social maladjustment, neuroticism, somatic preoccupation, aggression, paranoia, and suicidal tendencies (Johnson & Sarason, in press; Sarason et al., 1978; Vinokur & Selzer, 1975). Correlations between life change and indices of academic performance have been obtained (Carranza, 1972) as have correlations between change and work performance (Harris, 1972), and job satisfaction (Sarason & Johnson, in press). For more extensive reviews

of research in this area see Dohrenwend and Dohrenwend (1974) and Rabkin and Struening (1976).

Despite the numerous correlates of life stress, a certain degree of caution is warranted in interpreting available findings. Studies in this area have been primarily correlational in design and cause-effect conclusions cannot be drawn. Even though it seems reasonable to expect that life stress may have a detrimental effect on the health and adjustment of individuals, significant correlations may be obtained for other reasons. It may be that persons with problems of health and adjustment simply tend to experience greater degrees of life change or that both life stress and problems of health and adjustment covary with some third variable. Some preliminary studies of life stress, designed to investigate the possibility of causal relationships, have been conducted, however (Johnson & Sarason, in press; Vossel & Froehlich, 1978). They have yielded data consistent with the hypothesis that life stress exerts a causal influence. Further research concerning the nature of life stress - dependent variable relationships is greatly needed.

In addition to considering the nature of the relationships found in life stress studies, it is necessary also to examine the magnitude of the relationships. While exceptions are to be found, correlations between measures of life stress and dependent variables have typically been quite low, often in the .20 to .30 range. Although finding significant relationships is of theoretical interest, it is obvious from the existing literature that life stress accounts for a relatively small proportion of the variance in the dependent measures employed. It would seem that by themselves life stress measures are not likely to be of much practical value for purposes of prediction. A logical question is whether this poor predictive ability is due to the inadequacies of life stress measures (unreliability of measurement, failure to separately assess positive

and negative life changes, method of quantifying the impact of events) or to other factors. Concerning the first possibility, it should be noted that several approaches to the assessment of life stress have been employed in the studies published to date. While there is evidence that instruments which distinguish between positive and negative events typically yield somewhat higher correlations with dependent variables, even these correlations tend to be of relatively low magnitude. Although it must be acknowledged that existing life stress measures are less than perfect, factors other than inadequacies of measurement may also be related to the low correlations which have typically been found. It would seem that at least two other factors may be involved. One relates to the fact that individuals may experience stress that is not a product of life change, the other to the failure of researchers to consider the role of moderator variables.

Life change represents only one type of stress which may influence health and adjustment. In terms of other situations one might include ecological stressors such as crowding, noise pollution and being exposed to extreme environments. There are also a host of other potential stressors which may impinge on the lives of individuals that are not experienced in terms of "recent life events." Examples might include the knowledge that one has some probability of developing a genetically related disease, or that one, at some earlier time, was industrially exposed to what is now known to be a carcinogen or simply the realization that one may not reach goals set earlier in one's career. Finally, there are undoubtedly a variety of day to day situations which do not bring about major life changes but which may nevertheless serve as stressors. To the extent that health and adjustment are influenced by stressors other than those assessed by life change measures, one might expect to find lower correlations between life stress and dependent variables.

It would seem that a second major factor contributing to the low correlations which have been obtained may be the failure of investigators to consider variables which may mediate the effects of life change on individuals. It is this generally neglected issue which is the focus of the remainder of this chapter.

The Role of Moderator Variables

People vary considerably in how they are affected by potential stressors. Some individuals get divorced, lose their jobs, experience financial hardships, death and illness in their families, and appear to suffer few serious long term physical or psychological setbacks. At the same time, others break down even though they have experienced what would objectively seem to be a relatively low level of stress. An important question concerns the nature of those variables that may determine which individuals are likely to be most adversely affected by life change.

Although several authors (Dohrenwend & Dohrenwend, 1974; Rabkin & Struening, 1976) have pointed to the important role of moderator variables, previous studies of life stress have usually been designed simply to assess the relationships between life change and other variables without considering that individuals may vary in how much they are affected by life changes. We believe that lack of attention to moderator variables constitutes a major limitation of much of the research in this area. One might argue that it is unreasonable to expect to find strong correlates of life stress unless such variables are determined and taken into account. As the mediators of life stress are identified, measured reliably and included in experimental designs, increased predictiveness is likely to result.

While there are relatively few studies which have been specifically designed to examine the role of moderator variables, the available evidence serves to emphasize the importance of this line of research. We shall review the evidence concerning the role of four potentially important moderator variables: social support, perceived control, stimulation seeking, and level of arousability. We will then discuss the implications of these research findings, and suggest directions for future research.

Research on Moderator Variables

Social Support

Studies with both animals and humans suggest that the presence of other members of the same species may serve to protect the organism from the effects of environmental stressors (Bovard, 1959). Illustrative of animal studies, Conger, Sawrey, & Turrell (1957) investigated the relationship between approach-avoidance conflicts and peptic ulcer formation in rats. They found that animals subjected to such conflicts in isolation had more ulceration than did those animals run in the presence of littermates. In an earlier study, Liddell (1950) had found that experimental procedures capable of bringing about experimental neuroses in single animals were less effective when the subject was run in the presence of another animal. It would appear that the mere presence of another animal exerts a stress buffering influence.

Observations of human beings under stress also suggest the importance of social variables. For example, studies of men in combat suggest that the presence of comrades ("buddies") has a stress reducing effect (Bovard, 1959). Cobb (1976) has described how involvement with persons capable of providing emotional support significantly ameliorates the effect of such specific stressors as job loss, bereavement, aging and retirement, and recovery from illness among others.

The growing evidence that the presence of, and contact with, others may enable persons to cope better with stressors has resulted in increased attention being given to the variable of social support during recent years (Caplan, 1974; Cassel, 1973; Henderson, 1977).

What is social support? Social support is generally thought of as involving something more than the mere presence of others. In the most general sense social support refers to the degree to which individuals have access to social resources, in the form of relationships, upon which they can rely, especially in time of need, but at other times as well. These resources might include spouse, family, friends, neighbors, community groups, and social institutions. Cobb (1976) has defined social support in terms of information leading the individual to believe that he/she a) is cared for and loved, b) is esteemed and valued, and c) belongs to a network of communication and mutual obligation. This view suggests that it may be the quality rather than the simple number of resources that is the essential ingredient in social support. In actual practice, researchers have employed a variety of operational definitions of social support ranging from the simple presence of a spouse to measures designed to assess the quality of relationships with spouse, family, and community. A major priority for future work in this area would seem to be the development of standardized measures of this construct.

An early study of social supports conducted by Nuckolls, Cassel, and Kaplan (1972) involved an investigation of life stress and pregnancy and birth complications. The women who served as subjects were administered during the thirty-second week of pregnancy the Holmes and Rahe (1967) Schedule of Recent Experiences, and a specially designed Psychosocial Assets measure. This measure was constructed so as to assess "subject's feelings or perceptions concerning herself, her pregnancy and her overall life situation including her relationships with her husband, her extended family and the community (p. 434)." Inspection

of this instrument suggests that while some attitudinal variables were assessed, the psychosocial assets scale is essentially a measure of social support. The researchers sought to interrelate indices of life stress, social support, and pregnancy and birth complications.

The percentages of women who had pregnancy and birth complications were categorized in terms of a) high and low life stress, both before and during pregnancy, and b) high and low psychosocial assets. No overall relationship between life stress and pregnancy and birth complications was found. Significant relationships were obtained only when the psychosocial assets measure was taken into account (see Table 1). High life stress was unrelated to complications

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Insert Table 1 about here

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among women also high in psychosocial assets. Life stress was, however, significantly associated with complications among women with low levels of psychosocial assets. As can be seen in Table 1, given high life stress scores both before and during pregnancy, women with low levels of psychosocial assets had almost three times more pregnancy and birth complications than did women with high psychosocial assets scores. In fact, 90.9 percent of the high life stress-low social support group displayed complications. Although the causal role of these variables has not been demonstrated, these findings are consistent with the notion that high levels of social support may serve to protect the individual from the adverse effects of life stress.

In a second study, de Araujo, Van Arsdel, Holmes, and Dudley (1973) investigated the relationship between life stress, psychosocial assets, and the dosage of adrenocorticosteroid drugs necessary to control symptoms in adult asthmatics. The psychosocial assets measure employed in this study was the

Berle Index (Berle, Pinsky, & Wolf, 1952), a measure which in large part assesses social support (Cobb, 1976). The drug dosage required to control symptoms of asthmatic patients high and low in both life stress and psychosocial assets is presented in Table 2. As can be seen the largest dosage was needed

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Insert Table 2 about here

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in the high life stress-low social supports group. This group differed significantly from the other groups. The findings suggest a relationship between life stress and severity of asthmatic symptomatology which varies as a function of social support. Assuming that life stress can exacerbate asthmatic symptoms, individuals possessing good social supports seem less adversely affected than those with poor social supports.

In a similar vein, Eaton (1978) examined the relationship between life stress and psychiatric symptoms. With social support defined in terms of individuals who were either married or not living alone versus those who were unmarried or living alone, the relationship between life stress and symptoms was significantly stronger among subjects displaying low social supports than among individuals having high levels of social support. Persons with low levels of social support may be the ones most adversely affected by life changes.

Not all studies have found social supports to be a significant variable. Andrews, Tennant, Hewson, and Valliant (1978) examined the contributions of life stress, social support, and coping style to psychological impairment. Rather than finding an interaction between social support and life change, they found that both variables were independently related to psychological impairment in an additive fashion. High life stress and low social supports

were related to increased risk of impairment while low levels of life stress and high levels of social support were related to decreased risk (similar findings were obtained with regard to coping style). While these findings differ from those cited above in that they do not show that social support reduces the effects of life stress, they do suggest that this variable is importantly related to psychological impairment.

Acknowledging some discrepant findings, taken together, the available evidence suggests that high levels of social support may play a stress buffering role and to some degree protect the individual from the effects of cumulative life changes. If this is true, there are some important implications for preventative action. As Dean and Lin (1977) have suggested, although it may not be possible for individuals to avoid experiencing stressful life events, it may be possible to help them mobilize supports within the community and thus, to some extent, protect themselves against the effects of stress. Furthermore, training people in social skills needed to get help from friends, relatives, and the community when stress reaches high levels might prevent a significant number of individuals from experiencing personal difficulties.

Locus of Control and Perceived Control

The degree to which individuals perceive themselves as having control over events may be an important moderator of the effects of life stress (Dohrenwend & Dohrenwend, 1974; Rabkin & Struening, 1976). This hypothesis seems reasonable given the results of numerous experimental studies of human response to controllable and uncontrollable aversive stimuli. Averill (1973) and Lefcourt (1973) have reviewed and discussed this literature.

People have a definite preference for controllable as opposed to uncontrollable stimulation. In an early study, Haggard (1943) found that self administered shock resulted in smaller changes in skin conductance than did shocks administered by an experimenter, suggesting that self administered shock

was less stressful. Pervin (1963) found that individuals prefer to administer electric shock to themselves rather than have shocks of the same intensity administered by an experimenter. Subjects given control over the timing and intensity of shock have been shown to experience less discomfort in response to specific levels of shock and to endure higher levels of shock than subjects given no control (Staub, Tursky, & Schwartz, 1971). Weiss (1971), in a widely cited animal study, found that rats given shock over which they had no control displayed greater degrees of ulceration than rats given controllable shock or rats who were simply confined and received no shock. Numerous studies of animals and humans have suggested that organisms presented with uncontrollable aversive stimuli from which they cannot escape develop characteristics of "learned helplessness" while those presented with escapable (controllable) aversive stimuli do not (Seligman, 1975).

Subject's perception of control may be sufficient to attenuate response to stressors regardless of whether or not stimulus control is actually exerted. Glass, Singer, and Friedman (1969) found that subjects presented with aversive noise and told that they could terminate the stimulus if it became unbearable performed significantly better on a variety of tasks than subjects who were not able to control the stimulus. Of particular interest is the fact that subjects in the controllability condition did not actually engage in control behaviors (subjects were asked not to terminate the noise unless absolutely necessary). The results suggest that it was simply the perception of control that reduced the detrimental effects of noise experienced by other subjects. Geer, Davidson, and Gatchel (1970) studied the stressor of electric shock. One group of subjects was told that they could reduce the duration of the shock which they would be receiving if they responded quickly to a signal preceding the shock. A second group of subjects received shock without being told that

they could control its duration. Subjects in the first group, who believed themselves capable of control, had significantly lower levels of skin conductance than subjects in the second group even though all subjects actually received shocks of the same duration, intensity, and the same number of shocks. It thus appeared to be the illusion of control that served to reduce the stressfulness of shock rather than actual control over the aversive stimulus. While in several of these studies controllability was confounded with predictability, their results provide support for the idea that controllability or even the perception of controllability may be an important determinant of the stressfulness of specific stimuli.

Are individuals who perceive themselves as having little control over events more adversely affected by life stress than individuals who feel capable of exerting control over life events? In a recent study Johnson and Sarason (1978) provided some evidence concerning this issue. In this study, college students were administered the Life Experiences Survey (Sarason et al., 1978), the Rotter (1966) Locus of Control Scale, the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) and the Beck Depression Inventory (Beck, 1967). As described earlier, the Life Experiences Survey (LES) is a measure of life change which provides an index of both positive and negative life change. The Locus of Control Scale is a self-report measure which assesses the degree to which individuals view environmental events as being under their personal control. Subjects scoring low on the measure (internals) tend to perceive events as being controllable by their own actions, while those scoring high on the scale (externals) tend to view events as being influenced by factors other than themselves. The State-Trait Anxiety Inventory assesses anxiety as a relatively stable dispositional variable (trait anxiety) as well as more transient levels of anxiety displayed in specific situations (state anxiety).

The Beck scale is a self-report measure of depression.

Based on research findings concerning the controllability or uncontrollability of aversive stimuli it was predicted that anxiety and depression would correlate with life stress only among subjects external in their locus of control orientation. This prediction would seem reasonable as one might expect undesirable life events to be more threatening and hence exert a more negative impact on persons perceiving themselves as having little control over such events. The obtained correlations between LES scores and measures of anxiety and depression are presented separately for internals and externals in Table 3. As can be seen, negative life changes were significantly related

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Insert Table 3 about here

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to both trait anxiety and depression, but, as predicted, this relationship held only for external subjects. While this study does not allow for cause-effect conclusions, its results are consistent with the view that persons are more adversely affected by life stress if they perceive themselves as having little control over their environment.

Stimulation Seeking and Level of Arousability

Some people appear to thrive on activities which are exciting, stimulating, and which might be expected to increase arousal level. They may enjoy traveling to strange places, prefer the unfamiliar to the familiar, and participate in activities such as skydiving, automobile racing, motorcycle riding, and water skiing. On the other hand, many individuals shy away from the unfamiliar, would never think of racing cars or going skydiving, and, indeed, seem to find everyday situations more arousing than they

would like. There are, of course, many people who fall somewhere between these two extremes and who neither consistently seek out nor attempt to avoid stimulation.

Zuckerman, Kolin, Price, and Zoob (1964) and Zuckerman (1971) have developed sensation seeking scales, designed to assess individual differences on this variable. The relationship between sensation seeking and a host of dependent variables such as drug and alcohol usage, participation in risky sporting activities, and extent and variety of sexual experience, has been explored in a large number of studies. Available evidence suggests that sensation seeking can be measured reliably and is a meaningful construct.

Zuckerman (1974) has attempted to account for individual differences in sensation seeking in terms of optimal level of arousal or stimulation. Individuals with a high optimal level of arousal may find usual levels of environmental stimulation insufficient and be motivated to seek out additional sources of stimulation. Persons with a low optimal level of arousal are motivated to avoid increased stimulation and may even seek to reduce ongoing stimulation in order to keep their state of arousal closer to some optimal level. Although the factors contributing to these presumed individual differences in optimal level of stimulation are at present unclear, it is possible that biological factors may be involved (Zuckerman, 1974).

Given that individuals seem to vary in their desire for or need to seek out stimulation, and perhaps their tolerance for stimulation as well, sensation seeking status may well serve as a moderator of life stress in much the same way as do social support and perceived control. If so, high sensation seekers might be expected to be relatively unaffected by life changes, particularly if they are not too extreme. These individuals may be better able to deal with the increased arousal brought about by the experiencing of such changes.

On the other hand, life change might have a negative effect on persons low in sensation seeking, as they presumably are less able to cope with arousing stimulus input. To the extent that stimulation seeking mediates the effects of life change one might expect to find significant correlations between life change and problems of health and adjustment with low but not high sensation seekers.

A study designed to test this prediction was conducted by Smith, Johnson and Sarason (1978). College students were administered the Life Experiences Survey, the Zuckerman et al. (1964) Sensation Seeking Scale, and the Discomfort Scale of the Psychological Screening Inventory (Lanyon, 1973). The Discomfort Scale is a self-report measure of neuroticism. Correlations between life change and Discomfort scores are presented separately for high and low sensation seekers in Table 4. As in a number of previous studies, positive change was

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Insert Table 4 about here

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found to be unrelated to the dependent measure. This was the case for both high and low sensation seekers. Negative change, however, was significantly related to discomfort scores. This relationship held only for subjects low on the sensation seeking dimension.

In a related study, Johnson, Sarason, and Siegel (1978) examined the relationship between LES scores and measures of anxiety, depression, and hostility as a function of arousal seeking. Seventy-six undergraduate psychology students completed the Life Experiences Survey, the Zuckerman and Lubin (1965) Multiple Affect Adjective Checklist (which provides measures of anxiety, depression, and hostility), and the Mehrabian and Russell (1973) Arousal Seeking Scale. The Arousal Seeking Scale, like the Sensation Seeking Scale, assesses the tendency

of individuals to engage in, or avoid, activities or situations which might increase arousal level.

As can be seen in Table 5, positive change was unrelated to dependent

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Insert Table 5 about here

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measures regardless of arousal seeking status. Negative change, on the other hand, was significantly related to measures of both anxiety and hostility. As in the Smith et al. (1978) study, this relationship held only for subjects low in arousal seeking. It is possible that individuals low on the sensation seeking-arousal seeking dimension are much more likely to be affected by life stress than are those high in sensation seeking.

Just as there may be individual differences in optimal level of stimulation (sensation seeking) so also there may be individual differences in the degree to which persons display increased arousal in response to environmental events (i.e., some individuals may display a greater degree of responsiveness than do others). While the sensation seeking variable relates to the degree to which persons have a preference for high or low levels of stimulation, level of arousability may be thought of in terms of one's autonomic response to events or situations. It would seem reasonable to predict that persons who show high levels of arousability would be more adversely affected by life stress.

Mehrabian and Ross (1977),in a study of arousability as a moderator, had subjects complete a specially constructed life change measure, an illness inventory (designed to assess recurring, nonrecurring, and psychosomatic conditions), and a measure of stimulus screening. The measure of stimulus screening, developed by Mehrabian (1977), served as an individual difference measure of arousability. Nonscreeners, as assessed by this measure, are presumed to attend to many aspects of potentially arousing events and are

thus more prone to exhibit high levels of arousal in response to these events. Screeners, in contrast, are presumed to impose a hierarchy of importance on various components of potentially arousing events (and thus do not attend to all aspects of these events) and because of this selective attention experience lower levels of arousal. Based on the assumption that nonscreeners are more arousable than screeners, Mehrabian and Ross predicted that arousing life change would be found to have a more detrimental effect on the health of nonscreeners.

Results of this study found main effect differences between screeners and nonscreeners when psychosomatic complaints were considered, with nonscreeners reporting more psychosomatic symptoms. Singificant interactions between arousing life changes and stimulus screening were also found, however, in analyses employing both psychosomatic complaints and nonrecurring illnesses as the dependent measures. Given high levels of life change, nonscreeners were found to display significantly more reported illness than did screeners. These findings seem to support the initial prediction that level of arousability may, in part, determine the extent to which persons are affected by life change.

Discussion

Life stress does not have uniform effects on people. Whether a given individual is adversely affected by life changes depends on other variables which moderate the impact of the changes. Since moderator variables have been largely ignored in research on life stress, it seems understandable that correlations between life stress indices and dependent measures have been low. To the extent that individuals are differentially affected by life changes and respond differently to stress, low correlations should be expected.

We have illustrated the role of moderator variables in life stress research by citing evidence concerning social supports, locus of control, stimulation

seeking and level of arousability. However, other variables may also be important. For example, Dohrenwend and Dohrenwend (1978) have emphasized the importance of the person's previous history of dealing with stressors. These authors have suggested that prior exposure to specific stressors may lead to habituation so that the later experiencing of these same events may result in lower levels of emotionality. The degree to which individuals are negatively affected by life stress probably depends imporatantly on whether they have had a history of experiencing similar stressors in the past. While there have been no life stress studies designed to investigate this relationship, some indirect support for this hypothesis is provided by the results of animal studies. Denenberg (1964), for example, reviewed a number of studies which suggest that exposure to early stimulation in the form of shock is related to decreased emotional reactivity to noxious stimuli experienced later in life.

Prior experience in dealing with stressors may be most important because it leads to the development of coping skills. Consider, for instance, the person who has grown up in an overly protective environment, constantly sheltered from even minor stressors, as opposed to the individual who, in the process of growing up, has been confronted with a variety of demands and challenges with which he/she has had to deal. It is likely that this latter individual would hold up better in the face of life stress experienced during adulthood, not only because stressors may result in lower levels of arousal if they are similar to prior stressors, but because this individual is also more likely to have developed coping skills necessary for successfully responding to new stressful situations. As Rabkin and Struening (1976) have noted, " . . . persons with more skills, assets, and resources . . . and broader experience tend to fare better. In general, the more competence individuals have demonstrated

in the past, the more likely it is that they will cope adaptively with a current stressor. The more experience they have had previously with a particular stressor, the more probable that their present responses will be effective," (p. 1018). Although one study of coping style (Andrews et al., 1978) cited earlier, suggested that coping (defined in terms of maturity of ego defense mechanisms) was related to psychological impairment directly rather than acting as a moderator, additional studies, using more objective measures of coping ability, are needed.

It seems likely that certain behavioral styles mediate the relationship between life stress and specific disorders. Friedman and Rosenman (1974), for example, have described characteristics of Type A and Type B individuals. The Type A individual has a sense of time urgency concerning responsibilities and commitments and displays high levels of restlessness, impatience, and competitiveness. Type B individuals are low on these characteristics. Research findings suggest that Type A individuals are more likely than Type B's to have heart attacks. Given the apparent relationship between behavioral style and cardiac disease, and the documented relationship between life stress and cardiac disorders it would be of interest to examine the joint relationships between life stress and Type A - Type B behavioral styles and heart disease. A reasonable hypothesis would be that life stress would be related to heart disease only in the case of Type A individuals rather than bearing a general relationship to myocardial infarction and cardiac death. As Hinkle (1974) has suggested, it may also be that the relationship between life stress and heart disease varies depending on a number of other factors such as abnormalities in carbohydrate metabolism, family history of heart disease, and history of cigarette smoking.

In addition to variables such as prior history of dealing with stressors, level of coping skills, and specific behavioral styles, Rahe (1978) has

as job loss, bereavement, aging and retirement, and recovery from illness among others.

suggested that a variety of psychological defense mechanisms such as repression, denial, and displacement may serve to protect the individual from the effects of life change. While quantifying these variables poses major problems for investigators interested in the role of personality dynamics, some measures reflective of defensive styles are available. Byrne and his colleagues (Byrne, 1961, 1964; Byrne & Sheffield, 1965), for example, have developed a measure of repression-sensitization which purportedly assesses individual differences in approach (sensitizing) - avoidance (repressing) tendencies in response to threatening stimuli. Research with this variable has indicated that while repressors tend to deny stress and indeed may deal with transient stressors more effectively than do sensitizers, repressors show higher levels of arousal in response to stressful situations, are less able to tolerate painful stimuli, and are less able to cope with repeated stressors (Geen, 1976). Given these differences, one might predict that repression-sensitization may be an important variable in determining individual responses to life stress.

Although more appropriately considered as a process than as a moderator variable, the individual's appraisal of events is also of obvious importance in determining whether or not events are perceived as desirable or undesirable, whether they are responded to as stressors, and the person's overall response to such events (Lazarus, 1966). It is not unlikely that this process of appraisal may also be related in a complex manner to variables like those considered in this paper. For example, appraisal of an event as a stressor may be importantly related to the degree to which individuals perceive themselves as having adequate coping skills, adequate social supports, and some degree of control over the event. Although the process of appraisal is difficult to assess and quantify it is to some extent taken into account by life change

measures such as the Life Experiences Survey which provides for individualized ratings of the desirability and impact of events. In addition to those variables noted here, there are likely to be others of a social, psychological, and physiological nature which one could logically expect to have a bearing on the individual's response to major life changes and which are worthy of investigation.

We believe that the research carried out to date on the relationships between life stress measures, on the one hand, and psychological and physical variables, on the other, have been of great value in uncovering facts and stimulating thinking. But it is just a beginning. Life change is not a synonym for stress. Life changes mean different things to different people. Whatever it is that makes for differentness among people mediates between events and responses to them. Moderator variables influence how a given event will be experienced, felt, and dealt with. Identifying and developing methods of reliably measuring relevant moderators would seem to be a major task facing life stress researchers. As research on moderator variables proceeds, it is likely that more complex research designs will be required so as to incorporate multiple interacting moderators.

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Table 1

Percentages of women high and low in life stress (before and during pregnancy) and high and low in psychosocial assets displaying pregnancy and birth complications

Life Stress Before Pregnancy	Life Stress During Pregnancy	Psychosocial Assets	
		High	Low
High	High	33.3	90.9
	Low	37.9	56.3
Low	High	40.0	39.3
	Low	53.6	48.2

Adapted from Nuckolls et al., 1972

Table 2

Average daily drug dosage (milligrams per day) for asthma patients high and low in life stress and social support

Life Stress	Social Support: High	Social Support: Low
High	5.6 mg./day	19.6 mg./day
Low	5.0 mg./day	6.7 mg./day

(Adapted from de Araujo et al., 1973)

Table 3

Partial correlation between positive and negative life change and measures of depression and anxiety for subjects differing in locus of control orientations

Locus of Control	Life Change Scores	Dependent Measures		
		Depression	Trait Anxiety	State Anxiety
Internals (N=55)	Positive Change	-.02	-.09	.10
	Negative Change	.10	.15	-.10
Externals (N=66)	Positive Change	-.05	-.11	-.15
	Negative Change	.32*	.31*	.10

*$p < .01$

From Johnson and Sarason, 1978

Table 4

Correlations between positive and negative life change and Psychological Screening Inventory Discomfort scores for subjects high and low in sensation seeking

Life Change Scores	Sensation Seeking Status	
	High	Low
Positive Change	-.10	.10
Negative Change	.15	.35*

*$p < .05$

Based on data obtained by Smith, Johnson, and Sarason (1978)

Table 5

Partial correlations between measures of life change and measures of anxiety, depression and hostility in subjects differing on the arousal seeking dimension

Arousal Seeking Score	Life Change Measure	Dependent Variables		
		Anxiety	Depression	Hostility
HIGH	Positive Change	-.15	-.23	.05
	Negative Change	-.01	-.04	.05
LOW	Positive Change	-.18	-.12	-.00
	Negative Change	.36*	.23	.46**

* $p < .05$
** $p < .01$

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